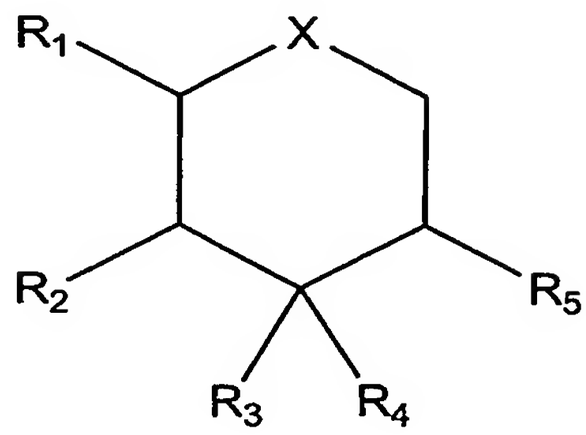
CLAIMS

What is claimed is:

1. A compound having the structure A:



(A)

wherein:

a) X is a moiety selected from the group consisting of oxygen, sulfur, and $-NR_6$;

b) R_1 is a substitutent selected from the group consisting of C_{1-10} substituted alkyl, and $-CH_2OR_{11}$;

c) R_2 is a substitutent selected from the group consisting of hydrogen, halogen, $-OR_{12}$, $-SR_{12}$, and $-NHR_{12}$;

d) each of R_3 and R_4 is a substitutent independently selected from the group consisting of hydrogen, halogen, azido, –CN, C_{1-10} alkylcarboxy, C_{1-10} arylcarboxy, and $-OSO_2R_7$, with the further proviso that R_3 and R_4 cannot both be hydrogen;

e) R_5 is a substitutent selected from the group consisting of heteroaryl, saturated heterocyclic, and $-NR_8R_9$;

f) R_6 is a substitutent selected from the group consisting of hydrogen, amino protecting group, C_{1-10} alkyl, C_{1-10} substituted alkyl, aryl, C_{1-10} alkylcarbonyl, arylcarbonyl, C_{1-10} alkyloxycarbonyl, aryloxycarbonyl, and $-SO_2R_{10}$;

g) each of R_8 and R_9 is a substitutent independently selected from the group consisting of hydrogen, and C_{1-10} alkyl, or R_8, R_9 and the nitrogen atom to which R_8 and R_9 are attached, combine to form a saturated heterocyclic or heteroaryl ring;

h) each of R_7 and R_{10} is a substitutent independently selected from the group consisting of C_{1-10} alkyl, C_{1-10} substituted alkyl, aryl and substituted aryl;

i) R_{11} is a substitutent selected from the group consisting of hydrogen, hydroxyl protecting group, $-P(O)(OR_{15})(OR_{16})$, and $-CH_2P(O)(OR_{15})(OR_{16})$;

j) R_{12} is a substitutent selected from the group consisting of hydrogen, $-PR_{13}R_{14}$, hydroxyl protecting group if R_2 is $-OR_{12}$, thiol protecting group if R_2 is $-SR_{12}$, and amino protecting group if R_2 is $-NHR_{12}$;

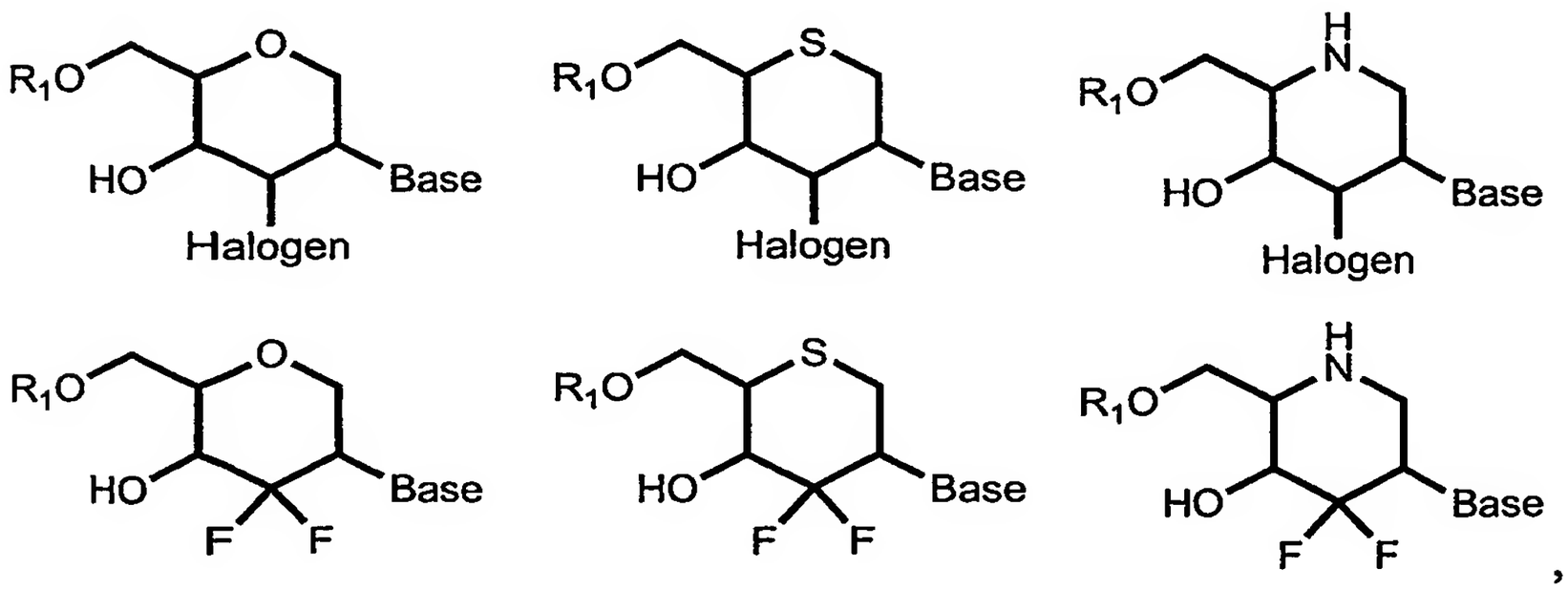
or if R_1 is $-CH_2OR_{11}$ and R_2 is $-OR_{12}$, then R_{11}, R_{12} and the oxygen atoms to which R_{11} and R_{12} are attached, combine to form a cyclic acetal or ketal;

k) each of R_{13} and R_{14} is a substitutent independently selected from the group consisting of $-NR_8R_9$, and $-OCH_2CH_2CN$; and

l) each of R_{15} and R_{16} is a substitutent independently selected from the group consisting of hydrogen, and C_{1-10} alkyl,

or a pharmaceutically acceptable salt thereof.

2. Compounds selected from a group having the formulae:

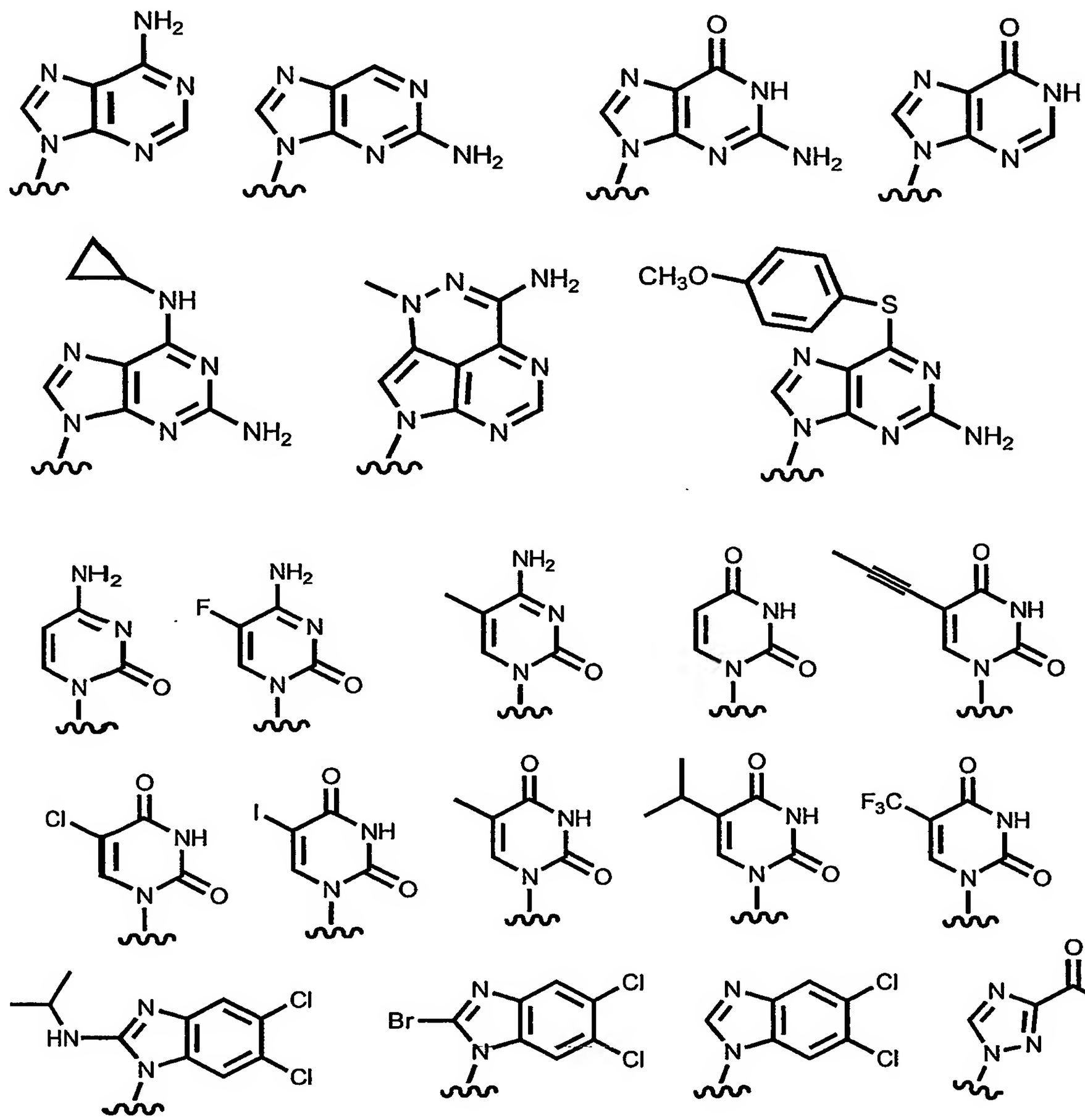


wherein:

a) R_1 is a substitutent selected from a group consisting of –H, PO_3H, and $–CH_2OPO_3H$;

b) halogen is selected from F, Cl, Br, and I; and

c) base is a moiety selected from the group having the formulae:



and pharmaceutically acceptable salts thereof.

3. A pharmaceutical composition comprising at least one of the compounds of claim 1, and pharmaceutically acceptable pro-drugs and salts thereof.

4. The pharmaceutical composition of claim 3, further including a pharmaceutically acceptable vehicle, for enteral, parenteral, topical or ocular administration.

5. The pharmaceutical composition of claim 3, for the treatment or prophylaxis of viral infections.

6. The pharmaceutical composition of claim 3, for the treatment or prophylaxis of bacterial infections.

7. The pharmaceutical composition of claim 3, for the treatment or prophylaxis of fungal infections.

8. The pharmaceutical composition of claim 3, for use in antisense therapy.

9. The pharmaceutical composition of claim 3, for the treatment or prophylaxis of cancer, diabetes and other diseases of genetic origin.

10. The pharmaceutical composition of claim 8, for the treatment or prophylaxis of cancer, diabetes and other diseases of genetic origin.

11. A method for treating cancer, the method comprising administering to a subject in need thereof an effective amount of at least one compound of claim 1, in a pharmaceutically acceptable vehicle.

12. A method for treating cancer, the method comprising administering to a subject in need thereof an effective amount of at least one compound of claim 1, in a pharmaceutically acceptable vehicle.

13. The method of claim 12, wherein cancer is selected from a group consisting of mammary cancer, prostate cancer, kidney cancer, Karposi's sarcoma, colon cancer, cervical cancer, lung cancer, cutaneous T-cell lymphoma, cancer of the head and neck, cancers of the aerodigestive pathway, skin cancer, bladder cancer, sarcomas, leukoplakias, and acute promyelocytic leukemia.

14. The method of claim 12, further comprising administering, in combination with a compound of claim 1, at least one other chemotherapeutic agent selected from the group consisting of Busulfan, Carboplatin, Cisplatin, Cyclophosphamide, Cytosine arabinoside, Etoposide, 5-Fluorouracil, Melphalan, Methotrexate, Mitoxantrone, Taxol, Interferon, Fareston, Arzoxifene, Evista, and Tamoxifen.

15. A method for modulating the expression of enzymes, proteins, nuclear factors or receptors in cells or tissues comprising contacting the cells or tissues with at least one compound of claim 1 or 2.

16. A method for modulating the expression of enzymes, proteins, nuclear factors or receptors in cells or tissues comprising contacting the cells or tissues with at least one composition of any one of claims 3-10.

17. A method for treating a subject suspected of having or being prone to a disease or condition associated with expression of said enzymes, proteins, nuclear factors or receptors, the method comprising administering to a subject in need thereof an effective amount of at least one compound of claim 1, in a pharmaceutically acceptable vehicle.

18. A nucleic acid probe constructed from at least one compound of claim 1.

19. A method for using a nucleic acid probe according to claim 18 for the identification and quantification of a bacterium, virus or any other organism in sputum, urine, blood, tissue sections, food, soil, water.